

# Public Safety in Complex and Built Environments

Capstone Guidance on Integrated Safety Management





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## Preface

This guidance has been issued by the Civil Contingencies Secretariat of the Cabinet Office.

Its purpose is to articulate the principles of integrated safety management, as a reference for those with responsibility for public safety in complex and built environments. It is not a handbook for safety managers or an operations manual and does not attempt to deal with safety issues at that level of detail. Rather, it is capstone guidance, which concerns itself with issues relating to multi-agency integration and coherence in public safety management. It draws on the established body of good practice and guidance that informs the work of emergency planners and responders in the wider resilience community.

Key principles have been abstracted from this body of experience, thought and practice, and adapted for application in the complex and built environment. Where appropriate, reference to other documentation and supporting guidance is given in the text. This is done to avoid duplication and to preserve this document as an executive summary of the main strategic principles. The

key theme running through this guidance is the need for safety managers to integrate emergency planning and response arrangements across the whole, potentially diverse, user and stakeholder communities associated with complex facilities. This integration needs to take place between the different agencies represented in the business of the facility, and between the facility and the various external stakeholders – including the emergency services and other elements of the wider resilience community.

Following this guidance is not compulsory. However, if you do follow it properly you will normally be doing enough to conform to the principles and good practice that are generally accepted by the emergency planning and resilience professions.

It makes 19 key recommendations that are boxed and in orange type. Supporting information is also boxed and given in light blue type, to distinguish it from the main text.

## Introduction

1. For the purposes of this guidance a complex and built environment is one that has one or more of the following characteristics:

- Large, complex structures with functional geometry related to the assembly, movement, processing and dispersal of large numbers of people.
- Multiple activities and embedded business functions that may be subject to different regulatory regimes.
- High density and a high level of diversity of occupancy and usage.
- Diverse, multiple and/or fragmented ownership, management or tenancy.

2. For reasons of brevity and consistency, the term 'facility' is used in this guidance. It should be noted that, from a strategic resilience perspective, such facilities may be important in macro economic and political terms. Indeed some, such as major transportation hubs and systems, may be a vital part of the regional or national infrastructure.

3. The following is an indicative list of the sort of facilities that may meet the definition given above. It is, however, not meant to be either prescriptive or exhaustive:

Sports stadia	City or town centre complexes	Large educational establishments
Entertainment venues and arenas	Business and office complexes	Cruise ships, ferries and passenger ports
Major tourist attractions	Retail parks and shopping centres	Airports and railway stations
Conference/exhibition centres	Tunnels and tunnel complexes	Mass rapid transit systems



4. Some facilities of these types may be managed by designated Category 2 Responders under the Civil Contingencies Act 2004 (CCA). As such, they have a statutory duty to share information and co-operate with civil protection agencies who are Category 1 Responders - such as the emergency services and local authorities. This is meant to facilitate better and more informed planning by Category 1 Responders, higher levels of stakeholder engagement in resilience activity and better representation of the full range of interests and organisational perspectives. For the operators of other facilities not designated as Category 2 Responders, achieving similar levels of co-operation with safety management partners and stakeholders is a matter of good practice, underpinned by a professional regard for the public good and an appreciation of the benefits of close liaison with the resilience community, which will include:

- A wider network of useful contacts in the emergency services and the emergency planning units of local authorities.
- A better-developed understanding of strategic local resilience issues.
- An improved ability to integrate the facility's plans and public safety arrangements with the generic response capabilities and intentions of the emergency services and local authorities.
- Making a facility's business reputation more robust, by demonstrating a fully developed commitment to public safety that translates visibly into an integrated, multi-agency approach.



### Category 1 & 2 Responders

This nomenclature is used in the CCA and its associated guidance to distinguish between two types of responder in the civil protection community. No attempt to identify them definitively will be made here because the Civil Contingencies Secretariat maintains a current list. In summary, Category 1 Responders are those who attract a wide range of duties under the CCA. Essentially, this means an obligation to share, on a defined local basis, the responsibility for assessing the risk of emergencies, planning for them, warning and informing the public and having business continuity arrangements in place. The list of Category 1 Responders includes the emergency services, local authorities, and others – such as primary care trusts and the Environment Agency.

Category 2 Responders are those who attract only the limited duties to co-operate with Category 1 Responders and share information with them, in order to facilitate their work and enhance resilience. The list of Category 2 Responders includes the main transportation, utility and telecommunications providers, and airports and ports with a certain level of passenger and/or freight throughput.

The main vehicle for co-operation and co-ordination between these agencies is, in England and Wales, the Local Resilience Forum (LRF). These are strategic planning bodies formed on police constabulary areas (outside London) or groups of Boroughs (within London). In Scotland they are called Strategic Co-ordinating Groups. These bodies operate on a basis called *right to invite and right to attend*. Participation is not restricted to CCA-designated responders; the managements of major facilities should be represented in some form and all should be closely aware of the LRF's work, and able to ensure that they can contribute to it as appropriate.



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## Overview

5. In this context, the main risks to public safety stem from interactions between masses of people, the built environment that surrounds them and the systems embedded in it or interlocking with it – such as means of mass transportation. These interactions can take many forms and combine in different ways. Multiple interactions magnify and compound the overall level of risk, which can increase exponentially with the size and complexity of the environment. Thus, the level of risk can change rapidly and disproportionately in response to minor variations in prevailing conditions. This makes risk and safety management in complex and built environments particularly challenging.

6. Without effective management, the margins between safety, danger and disaster can be narrow, unstable and even unknown. Events like the 1987 King's Cross fire have shown a very rapid shift between what was considered normal operating conditions and disaster. This rapid transition was also a feature of several other disasters in the UK (and elsewhere) in sports and entertainment venues, major transport hubs and other facilities that concentrate masses of people in complex and built environments.

7. It is essential that those with responsibilities for the design, certification, construction, ownership, operation and management of such facilities understand the scale and complexity of the safety challenges that they face. They must receive appropriate guidance and discharge their responsibilities and duties of care professionally.

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### Key Recommendation 1

Managers of facilities not designated as Category 2 Responders should, nonetheless, strive to achieve similar levels of engagement with the local Category 1 Responders – as a matter of good practice. This means establishing good liaison with the principal members of the LRF and securing an appropriate level of input to its work.

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### Key Recommendation 2

Be aware of the potential for small deviations from the operating norm to have potentially disproportionate impact, possibly leading very quickly to crisis. This implies a need for close monitoring of conditions, working practices and safety standards. When conditions and practices change, the safety implications must be analysed, risks reviewed and emergency plans adapted as appropriate – in a coherent way and in consultation with stakeholders. Safety Management is thus an iterative set of processes which should be an integrated part of routine management activity, and not simply a set of bolt-on contingency arrangements to be referred to when something goes wrong.

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## The Aim and Scope of The Guidance

8. The purpose of this guidance is to provide a unifying set of concepts and doctrine to support the training, education and work of those responsible for integrating the diverse body of legislation, regulations, standards and guidance that apply in this area. This includes:

- The Health and Safety at Work Act 1974.
- The Management of Health & Safety at Work Regulations 1999.
- Fire and Rescue Services Act 2004 & guidance pursuant to the Regulatory Reform (Fire Safety) Order 2005.
- *Guide to Fire Precautions in Existing Places of Entertainment and Like Premises*: Home Office 1990. The Primrose Guide.
- *Guide to Safety at Sports Grounds*: Department of Culture Media and Sport 1997. The Green Guide.
- *The Event Safety Guide*: Health & Safety Executive 1999. The Purple Guide.
- *Managing Crowds Safely*: Health & Safety Executive 2000.
- *Report of the Investigation into the King's Cross Underground Fire*: Mr Desmond Fennell OBE QC: Department of Transport 1988, and other enquiry reports.
- *Emergency Preparedness* – Guidance on Part 1 of the Civil Contingencies Act 2004.
- *Emergency Response & Recovery* – non-statutory guidance supporting *Emergency Preparedness*.
- *Evacuation and Shelter Guidance* – non-statutory guidance supporting both of the above.
- Various guidance produced by transport industry regulators and for the construction and design industry.

9. This guidance does not replicate, replace or supplant any of these authoritative instruments and publications. Nor does it refer in detail to the technicalities of allied disciplines such as architecture, engineering, crowd dynamics or security. Instead, it offers a set of general principles to guide the strategic thinking and activities of those with responsibilities for safety in complex and built environments. It should help them consider the range of factors that will inform their preparedness for, response to and recovery from, situations that threaten public safety.

## The Concept of Integrated Safety Management (ISM)

10. ISM is based on the UK national model of Integrated Emergency Management (IEM). This is extensively referred to in both Emergency Preparedness and Emergency Response & Recovery, which are the guidance documents that support the CCA. Very little modification is needed to make it appropriate for complex and built environments, and several advantages follow from its use. These include:

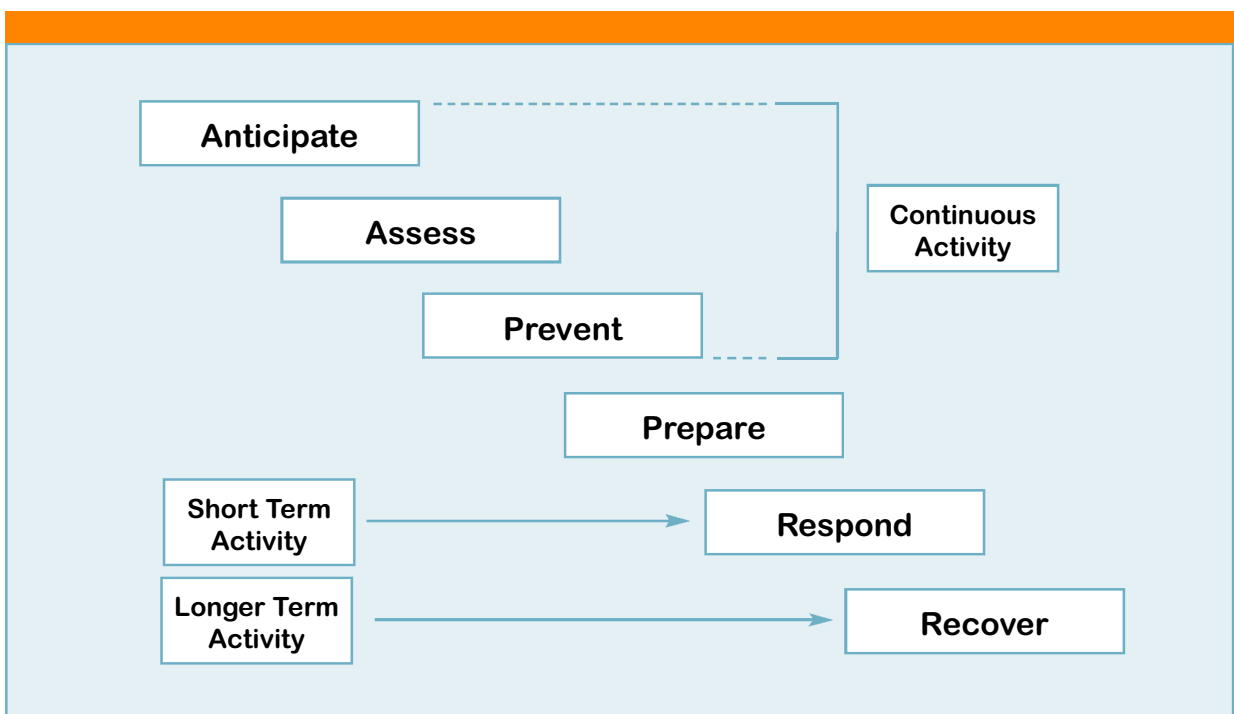
- Extending the application of a familiar, consistent and national model for the anticipation, assessment, mitigation and management of risks.
- A common and accepted set of descriptions, nomenclature and processes.
- The integration of risk assessments and plans into the wider risk and emergency planning arrangements of Category 1 responders.
- Providing common ground for effective discourse between the organisations directly involved, including the emergency services and local authorities.



### The Origin and Development of Integrated Emergency Management (IEM)

The concept had its origins in a series of major disasters in the late 1980s, several of which were in complex and built environments that fall within the definition used in this guidance. Many of the lessons learned related to the need for better co-ordination of the various responders' activities before, during and after the events. Thus, IEM was conceived as a concept of operations to bring unity of effort and purpose to multi-agency resilience activity. It underpins the statutory duties and good practice identified in *Emergency Preparedness and Emergency Response and Recovery*, and provides a common, coherent framework for the management of resilience activity. It is accepted, understood and used by the emergency services and other civil protection agencies.

11. The diagram below shows ISM as a series of discrete steps. However, it is essential to view them as mutually supporting processes and not as sequential activities. The first four processes are continuous and connected. The response process is the short-term reaction to an event, and recovery is the long-term process of managing the return to normality. Lessons learned from reviews, events, exercises, near-misses and recovery must be identified, analysed and recorded. They should then inform the first four stages of the cycle. Consequently, the model is an iterative cycle, with auditable links between its different stages and between events, changes in the risk environment and safety management activity.





- They are a locus of risk, due to the concentration of people and their patterns of interaction with the environment in different circumstances.
- It is a means of ensuring that the site-specific safety planning, which is the responsibility of the operator(s), is coherent with the emergency plans and response arrangements of the local authority and emergency services.

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### Key Recommendation 3

Adopt the concept of ISM. It provides a means of ensuring that safety planning and related activities are strategically integrated across the stakeholder group and coherent with those of resilience partners such as local authorities and the emergency services.

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### Anticipation and Assessment

12. The intimate connection and continuous operation of anticipation and assessment make it sensible to consider them jointly. They involve scanning the environment in order to identify risks and then analysing them in order to establish their likelihood and impact. These processes should start before the facility in question is designed and built, and be continuous until it is eventually decommissioned.

13. Members of the resilience community who are identified as Category 1 Responders under the CCA have a duty to assess the risk of emergencies and publish all or part of their assessments. This is usually done in the form of a Community Risk Register (CRR), the community in question being a constabulary area outside London or a group of boroughs within it. Major complex and built facilities should figure in this register for two main reasons:

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### Key Recommendation 4

Ensure that the facility and its associated risks are reflected in the CRR, as the first step to integrating safety management with the activities of the local emergency planning community.

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14. This may raise issues of commercial sensitivity, which could give facility operators legitimate concerns. Regulations supporting the CCA define commercially sensitive information as:

*“information which relates to the business or other affairs of a person or organisation, and disclosure of which would prejudice the legitimate business interests of the person or organisation to whom the information relates”.*

Emergency Preparedness 3.17 p27

15. Such information may be held in confidence. It can be kept in a restricted annex of the CRR and not released to the public. This is done to protect the interests of commercial resilience partners, foster mutual confidence and thereby encourage co-operation. The key point of judgement is the best interests of the public and the extent to which prior knowledge of risk and response strategies would help them prepare sensibly, and therefore contribute to resilience. This must be balanced with caution, and the need to avoid creating undue and inappropriate public concern. It follows that issues of sensitivity and disclosure must be discussed with the other members of the resilience community, especially those responsible for the publication of risk assessments and plans.

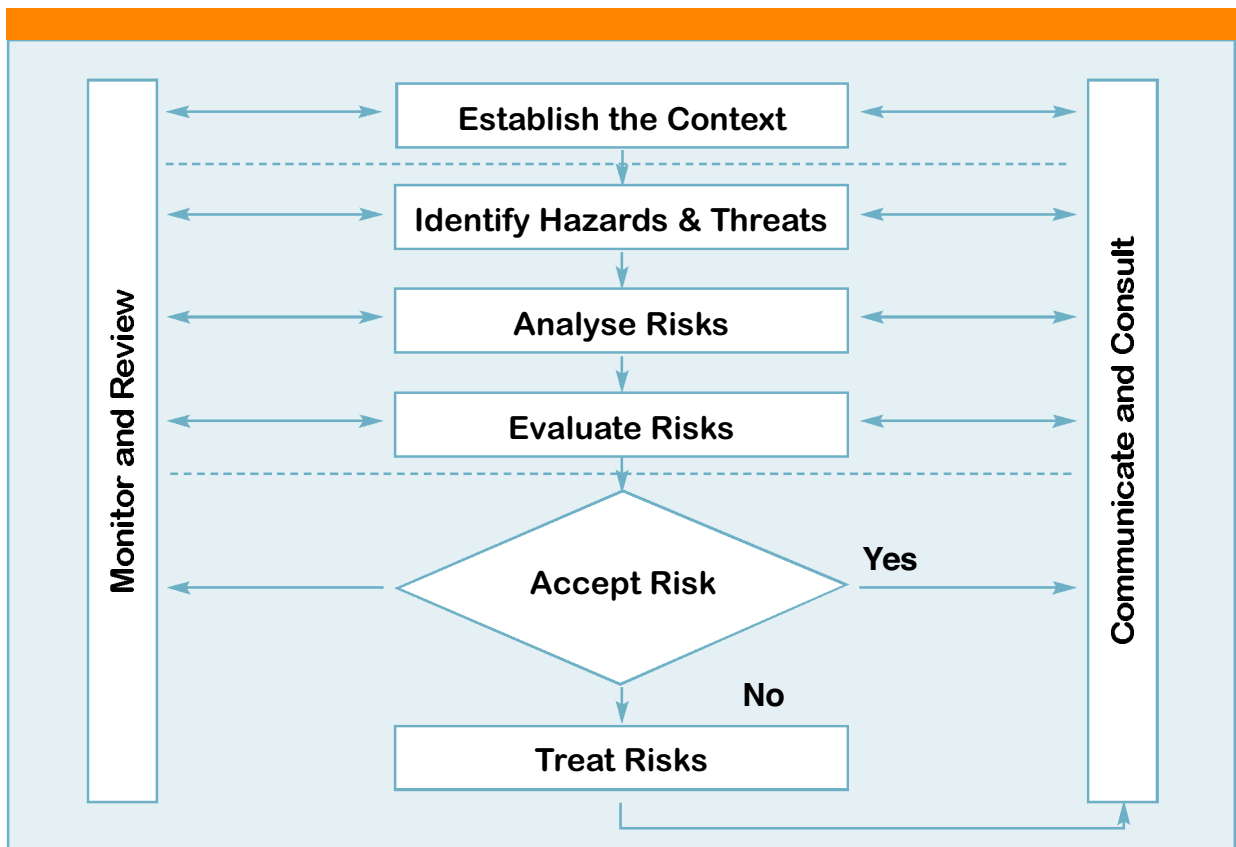
### Key Recommendation 5

Liaise with the LRF to ensure that commercially sensitive information is handled correctly, and withheld from publication if there is a legitimate and reasonable case for doing so. This implies a need for mutual confidence and trust, of the sort that can only be built up and maintained through close and regular liaison. Commercial partners with concerns over the sensitivity and disclosure of information should refer to Chapter 3 of Emergency Preparedness.



16. For assessing the risk of emergencies, Category 1 responders are strongly encouraged to use the UK's common model – to ensure commonality, coherence and consistency. This is described in detail in Emergency Preparedness (Chapter 4) and shown below.

### The Emergency Preparedness Risk Management Model



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## Emergency Risk Management

Part of the process of establishing the context in this model involves examining the whole community in order to identify potential risks to public safety, the environment and security. Significant complex and built facilities are, of course, part of the community and should figure in this examination. Analysis entails determining a value for the likelihood and impact of the risk, and evaluation is the act of grading the risk (by using a matrix) according to categories ranging from Very High to Low – before using the outcome of the overall process to determine acceptance, treatment and priority. Communication, consultation, monitoring and review are embedded processes, making the model dynamic and iterative.

Results are recorded in a Community Risk Register. There is an expectation that it will be published on the internet, less those parts deemed commercially sensitive, prejudicial to security or otherwise selected for restricted handling. If complex and built facilities are represented in this process, the generic emergency planning assumptions and capability modelling of Category 1 Responders will be improved. Safety managers of facilities should ensure that their on-site plans and arrangements are coherent with these assumptions, that the associated plans are integrated and that all stakeholders are fully informed. Engagement with Category 1 Responders, through estabresilience procedures, will facilitate this.

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**17.** There are certain differences between this model and those with which most safety and facility managers will be familiar. Most will have a system of safety risk management in place, which will be based on good practice and fit for internal purposes. However, it is important that they understand the differences between their methodologies and those used by partner agencies in the resilience community – so that they understand the nomenclature and processes being used, can contribute to them effectively and achieve the desired level of linkage.

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## Key Recommendation 7

Safety managers should familiarise themselves with the Emergency Preparedness model of risk management. There is no need to adopt it for internal purposes, but there is a need to understand it because the LRF's Risk Assessment Working Group will be using it in the production of the CRR.

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## Key Recommendation 8

A single, common safety risk management methodology should be agreed and used by all the operating groups within a complex and built facility. Without this commonality, it would be very difficult to achieve comparison, coherence and integration.

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**18.** In the Emergency Preparedness model, there are specific processes attached to the assessment of likelihood and impact at the analysis stage of the process, and technicalities relating to the way the results are modelled at the evaluation stage. It also distinguishes between hazards and threats, as follows:

- Hazards are identified as naturally occurring phenomena, accidents or the product of negligence or mischance.
- Threats are identified as the product of malicious intent. This is normally taken by the resilience community to mean terrorism, but in this context it can also apply to serious, organised crime. However, it is worth noting that the CRR will be concerned primarily with serious risks to the public, the environment and security – in other words those events that meet the CCA definition of an emergency.

**19.** Threats will not be considered in more detail. Assessments are made in a separate and specialised process and the police will inform those likely to be affected. Hazards, though, deserve some further discussion.

**20.** The basic hazards that may impact on a facility are mostly commonplace, such as fires, floods and systems failures. The key point is that the interaction between masses of people and a complex environment may cause a small initial event to create a disproportionately great effect. This can happen very quickly. In the case of fire this may be because a mass people are unable to escape (such as at King's Cross Station, Bradford City football ground or Dusseldorf Airport). Alternatively, as a mass of people try to escape, members of the crowd may be killed or hurt by crushing and asphyxiation. There may even be a combination of the two effects (such as in the Dublin Stardust incident). In addition, surge effects within crowds can occur without direct physical stimulus, and be compounded by confined space and lack of a escape routes (such as at Hillsborough and Ibrox Park football grounds). In overview, the key hazards may be defined as:

- **Fire.** Within a complex environment fire is the most potent risk owing to its multiple effects. Flame and smoke are potentially lethal. Smoke degrades visibility, obscures visual safety instructions and disrupts control. All of those effects can induce distress and panic. As a result fire prevention, technical standards and management are critical factors that must be addressed during the design and construction phases, and sustained during operation. Detailed guidance on all of those issues is contained in the references given above, and this should be supported by continuous liaison with and advice from the Fire & Rescue Service as part of the facility operator's legal responsibility for fire risk assessment.
- **Structural Failure.** These failures can occur as a result of design deficiencies, inadequate construction quality, degradation or overloading. In the past 25 years failures have tended to originate from the first 2 factors (such as with

the Hyatt Hotel in Kansas and Charles de Gaulle Airport in Paris). Nevertheless the monitoring of possible structural degradation remains a fundamental safety management responsibility. Overloading risks can arise from changes in use, procedures and crowd movement. Therefore, any variations in those areas must be associated with a new risk assessment. Again, it is essential not to underestimate the possible impact of what may appear to be trivial changes, especially in areas and passages that carry large flows of people.

- **Service Failure.** Although not directly life-threatening, the loss of critical services such as lighting and ventilation can produce distress which, if unmitigated, may create serious risks. The continuity of services – as far as is reasonably practicable - is a safety-critical issue and management responsibility.

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### Key Recommendation 9

Treat the continuity of basic utility supplies (especially electricity) as a safety-critical issue. Their disruption should trigger a safety management response. However, utility supply interruption is also a foreseeable complicating factor in the response to other crises. Plans must be flexible enough to work, and deliver public safety, despite utility supply interruption. Category 1 Responders have a duty to put into place business continuity arrangements, to ensure that they can continue to respond to emergencies and protect the public – even when they are directly affected by disruptive challenges. Facility and safety managers in complex and built environments should aspire to achieve the same degree of structural and procedural resilience, as a matter of good practice.

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- **Crowd Effects.** Risks can arise from the behaviour of a mass of people, especially when they are contained in a complex and unfamiliar environment. The likelihood of adverse crowd effects depends on a range of factors, and behaviour patterns can change rapidly depending on the prevailing conditions. This is a safety management challenge that must be addressed holistically, systematically and continuously. Detailed guidance on this complex subject area is contained in the references.
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### Key Recommendation 10

Consider training for managers and planners in crowd behaviour and dynamics, so that planned responses, like evacuation, and communication strategies are based on sound assumptions about human behaviour.

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**21.** The main issue is that risk management strategies must be coherent and integrated at all levels of the organisation and between partners, because the results of such a dynamic process never exist in isolation. Risk management activity always effects the environment in which it operates and an attempt to mitigate risk in one area will impact on the distribution and intensity of risk overall. Safety managers must be aware that:

- Their risk management activity may increase or intensify risks in other areas of the complex and built environment.
- The risk management activities of others may have a similarly detrimental impact on their own activities.

**22.** A simple example could be the evacuation of a large, multi-use facility. Without co-ordination and coherent planning, there is a risk that streams of evacuees leaving by different exits could collide and impede each other, leading to a breakdown in control. They may also, by accident or design, converge on an inadequate, unsuitable or even dangerous assembly point. They may even impede the access and deployment of the emergency services. In short, evacuation is a risk

in itself, and carries a high potential for hurting the people it is designed to protect. This must be minimised by coherent planning and co-ordination. Another dimension of this issue is the treatment of the public once they have been evacuated to a place of safety. Plans must take into account the influence of external factors such as the weather, and this implies a duty of care for those who have been evacuated, extending beyond merely getting them away from danger. For example, a crowd evacuated to an exposed assembly point in adverse weather will experience distress if they have to be held there for anything but a short period of time. There will be a danger to the health of vulnerable people and serious damage to the reputation and credibility of the facility and its management.

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### Key Recommendation 11

Safety managers and planners must be aware of the potential for risk management activity carried out by one actor or agency, to adversely impact the risk management activities of others. Also, crisis response strategies must be followed through intelligently – to avoid creating new risks to public safety. It is critically important that risk management be conducted in a co-ordinated, coherent and strategic manner – and not in silos by the different agencies within the facility. It must also be coherent with the plans and response arrangements of the emergency services.

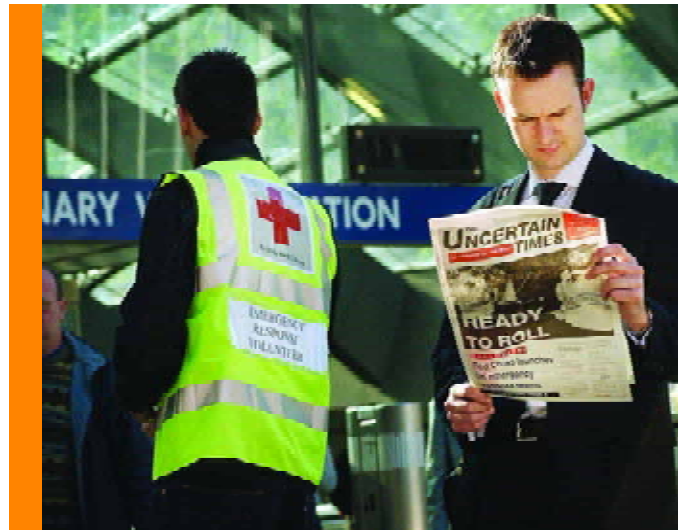
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**23.** In any well managed organisation, the anticipation and assessment of risks to public safety should be an integral part of wider risk management processes. They will attract a high priority and be effective throughout the life-cycle of a facility. Key factors that inform this approach include:

- **Accountability.** Overall responsibility for safety cannot be delegated and rests with the highest level of management. The delegation of specific safety tasks is normal, but this does not diminish that ultimate responsibility.



- **Clarity.** Delegation, roles and reporting lines must be clear, formally recorded and embodied in job descriptions. They must also be kept up-to-date.
- **Coordination.** In complex environments, and especially those involving multiple occupancy and use, close coordination of all risk-related activities is essential. Otherwise, the probability of incoherent and ultimately dangerous activity increases. Effective multi-party management rests on clear delineation of responsibility and the use of clearly defined co-operative structures and processes. This needs to be facilitated by continuous consultation.
- **Coherence.** The safety impact of any decision that may change the risk environment must be evaluated before its implementation, and included in revised documentation and instructions. Changes that may appear trivial can have disproportionate and tragic consequences, as evinced by the disasters at King's Cross and Hillsborough.
- **Continuity.** Safety systems and procedures should be under continuous scrutiny. This should be documented and subject to regular external audit.
- **Culture.** The effective management of safety in a complex environment requires leadership at every level to develop, embed and promote a culture of safe operation, disciplined behaviour and willingness to challenge infractions. The incremental growth of bad practice over time, and a generalised slippage in safety standards that may not be noticed at the time, are common features in the incubation of disasters. Standards must be established, communicated, resourced and maintained rigorously.



### Key Recommendation 12

Safety managers should periodically review their routine consultation processes, to ensure that they provide enough opportunity for communication and that these opportunities are used to good effect. Communication is the basis of co-ordinated public safety management. The processes that exist to make it happen should not be taken for granted, or assumptions made about their effectiveness.

**24.** The main implication of these principles is that organisations have to work hard to achieve the required outcomes, and devote precious time to consultation and liaison. Each entity operating in the facility should have clearly defined structures and processes for ISM that are mutually transparent and understood. Leadership and mutual responsibilities must be defined, agreed and documented. If the facility is large enough to feature in the local CRR, the lead organisation responsible for the entire environment must engage with key agencies such as the police, the fire service and the local authority – through the LRF or Strategic Co-ordinating Groups (SCGs) (in Scotland).

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## The LRF/SCG

These are normally chaired by the Chief Constable or a nominated deputy. It can be expected that all Category 1 Responders will be represented as a matter of course. Category 2 Responders may be present – under the terms of *right to invite and right to attend* – if matters under discussion concern them. Other agencies, without a duty under the CCA, may also be present. These may include the military, the voluntary sector and major facilities. LRFs/SCGs are expected to meet at least twice per year in full session. At other times, routine work is conducted by a range of sub-groups specialising in a particular field, such as risk, public information or the harmonisation of plans.

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## Prevention

**25.** Prevention covers the range of actions (technical, practical, procedural and organisational) that managers can take in order to limit either the likelihood of a hazard occurring or its impact should it occur. Those actions are applicable throughout the life cycle of a facility, from inception to demolition. The use of the term prevention does not, of course, imply that all risks can be eliminated.

- **Physical Risks.** The main strategies for preventing physical risks from becoming actual are based on a combination of engineering and regulatory approaches. Major facilities are subject to legislation, regulations, standards and guidance that seek to mitigate physical risks. The areas that they cover include fire prevention and management, component and materials specifications, standards, design and construction practice. No individual is likely to be expert in all these areas, and so the project team during design and construction, and the operational management team thereafter, must draw on professional advice across the spectrum of subjects in order to ensure compliance. From project inception to ultimate

demolition all of those standards will be subject to surveillance, inspection and enforcement by public bodies such as local government, and by chartered or licensed inspectors. Beyond those requirements designers may also seek to mitigate physical risks through engineering solutions and safety margins.

- **Crowd Effects.** Risks arising from crowd behaviour need special attention. Within any building project and during subsequent operation the key points are likely to be:
  - The full spectrum of crowd effects must be addressed in the design phase. This will involve the use of expert advice, calculation, modelling and simulation as inputs to the risk assessment. The aim is to 'design out' crowd hazards and 'design in' safety management features to minimise risks. This will also reduce the costs of subsequent rectifications, which could escalate rapidly through each subsequent phase of construction, commissioning, use and maintenance.
  - Similar actions must be taken whenever the facility is extended, modified or subject to major repairs or refurbishment. This includes any partial or total change of use.
  - The development of a safety management plan to mitigate crowd risks should start during the design phase, so that any supporting technical infrastructure is included from the outset (such as control rooms and alternate facilities, communications, cabling, access control measures and signage). The design must give latitude for subsequent technical modification, uplift and replacement at minimum structural cost. The crowd safety management plan should be developed and tested against the evolving design using models and simulations, and any assumptions built into this process must be rigorously validated.
  - Crowd safety management must be integrated with the project change control process during the construction phase to ensure that engineering modifications are checked for their wider potential consequences.

- People must be trained for the jobs expected of them in emergencies. Also, leaders and control teams undergo command training using simulations and exercises, followed by rigorous performance testing. These measures must be sustained during routine operation and modified by experience. The Identification of 'near misses' and 'warnings' is an essential part of the continuous learning process.
- Public safety in a major facility is not just the responsibility of safety managers and personnel, but of all staff. However, managers have a special leadership responsibility to create, promote and maintain a culture of safe operation.

**26. Post-Construction Modification.** The structural modification of a facility may be prompted by a number of potential safety issues. These include:

- **External Causes.** The most common of these are lessons identified from events or 'near misses' in similar facilities in the UK or elsewhere. These will usually precipitate changes to guidance or technical standards. Requirements that emerge products of legislation or from judicial direction (such as a formal inquiry report) will be mandatory and may involve significant cost in their implementation. Operating companies have no legal alternative but to comply.
- **Internal Causes.** Lessons identified internally from events, routine operations and 'near misses' may create a need for engineering or procedural modifications. These may involve substantial costs, especially in older facilities. The successful resolution of any conflict between cost and safety is the test of the quality of an organisation's management. For legal purposes it is essential that the reasons for not implementing any safety modification are formally documented.



### Key Recommendation 13

Records should be kept of all safety-related decisions. If a facility's public safety management comes under legal scrutiny a main concern will be with establishing whether its decisions (from risk assessments onward) were reasonable. This could not be proven without an auditable record of what was decided, when and why.

## Preparation

**27.** Preparation involves the activities necessary for a successful response to an incident which minimises its consequences. It is based on the assumption that no matter how comprehensive an organisation’s prevention and control measures are, incidents will still happen. In the context of large, complex facilities, preparation will pose serious management challenges, owing to the co-ordination demands of multiple occupancy, the size and nature of the workforce (including the discontinuity and seasonal variations prevalent in retail and leisure businesses) and the difficulty of maintaining effective communication within a large stakeholder community. If these challenges are to be resolved, then a systematic approach and clearly defined processes are essential. To that end preparation can be broken into 5 sub-processes conducted in a continuous cycle of:

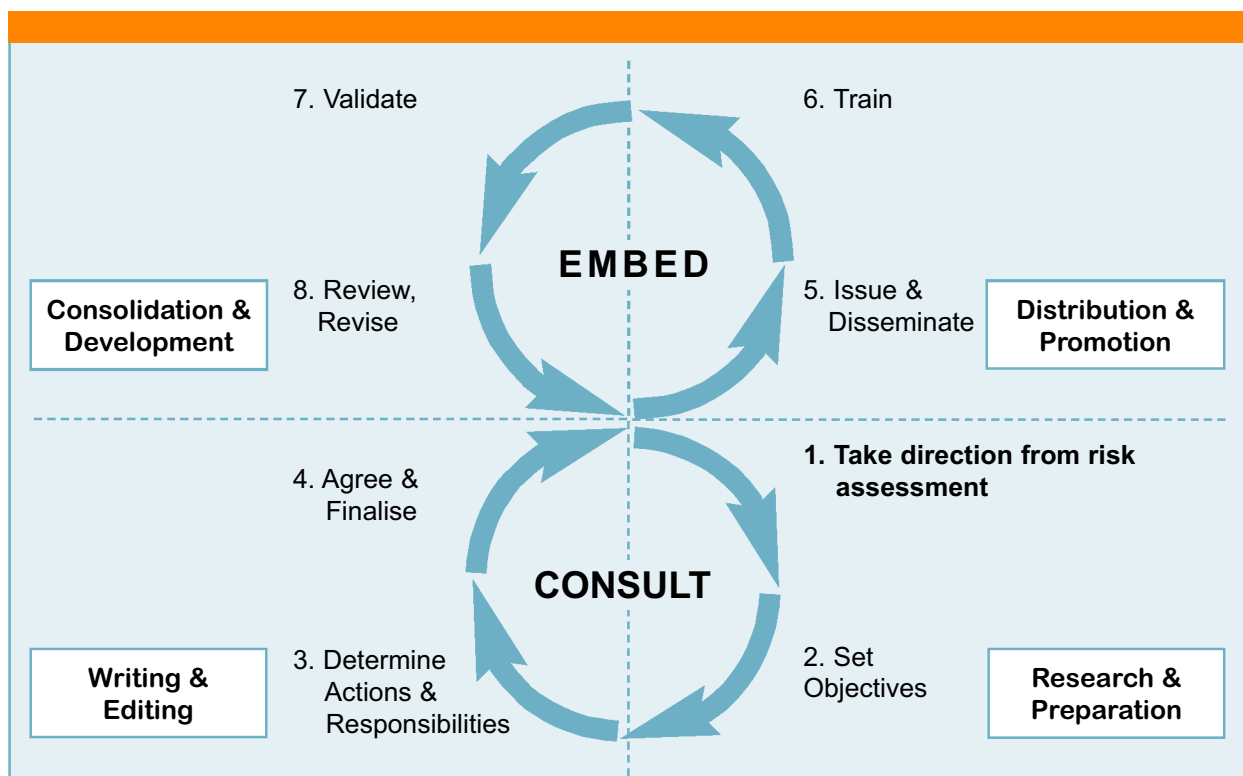
- Design, development, promulgation and embedding of instructions, procedures and drills.
- Planning for emergency response, on the basis of priorities derived from risk assessment.

- Developing response capabilities.
- Training and testing.
- Exercises.

**28.** The CCA cycle of emergency planning is shown below. It is described in detail in Chapter 5 of Emergency Preparedness. This is the model used by Category 1 Responders, who are required by the CCA to carry out emergency planning - in regard to the risks of emergencies that they have previously identified and analysed. The key implications of this model are:

- Writing the plan is only part of the overall process.
- The overall process is continuous.
- Training of people precedes validation of the plan by exercise and/or simulation.
- Risk assessment (which is dynamic) drives the whole process.

## The Emergency Preparedness Cycle of Emergency Planning



### Key Recommendation 14

Safety managers should carry out contingency planning within the framework of a rigorous and iterative model, and this is a good example of such. It is also the model that resilience partners in local authorities and the emergency services will be using. The model treats training, validating and reviewing as integral parts of the planning process, and also links planning to risk assessment. For these reasons its use is recommended.



**29. Instructions, Procedures and Drills.** Where a facility is used by the public, every employee has responsibility for the safety of visitors and customers. The purpose of instructions, procedures and drills is to enable employees carry out their safety duties properly. Their effectiveness and feasibility must be established before they are issued to staff. This requires pre-audit, followed by simulation, checking and testing under realistic conditions. They must be:

- **Simple**, to allow rapid and easy understanding. This is especially important in sectors with high rates of staff turnover. Signs and instructions displayed for the public must be correctly placed, oriented and sized. They must also cater for the full range of comprehension skills.
- **Clear**, to reduce the scope for misunderstanding or misinterpretation under stress. In some areas multi-lingual expression may be necessary. The needs of those with sight or hearing impairments must be taken into account.
- **Direct**, to ensure that employees and the public have no doubt as to what is expected of them.
- **Consistent**, to promote a coherent response across the entire facility. The determining factor is that the rapid movement of large numbers of people must not serve to increase the risk to which they are exposed.

### Key Recommendation 15

Safety managers should ensure that instructions, procedures and drills are appropriate, in that they are fit for the right purpose, and robust, in that they can be implemented in situations of danger and stress. The key elements of robustness in this context are simplicity, clarity, directness and consistency.

**30.** Embedding of instructions, procedures and drills needs a systematic approach at every level, from induction and periodic refresher training to rehearsals and full-scale exercises.

**31. Planning for Emergencies.** Detailed guidance on preparing emergency plans is in Chapter 5 of Emergency Preparedness. This describes a planning methodology but deliberately avoids giving a generic template for a plan. It is universally applicable. Key issues for planners in complex and built environments will include the following:

- The site risk register should drive the contingency planning process and its priorities. Facility-level plans must integrate coherently with those of the wider resilience community and its emergency responders.





- There must be a clear understanding that the production of an emergency plan is not an end in itself, but rather a continuous process.
- It is essential to include the emergency services, the local authority and all occupants of the facility in the planning process. This will help ensure a coherent plan, which has total stakeholder commitment and the benefit of wide-ranging expert advice.
- In situations with complex, multi-occupancy arrangements there is a need to achieve vertical coherence between the top level plan and all other occupants' arrangements; and lateral coherence and consistency between all occupants. In a very large facility this can present a significant challenge. For example, one major English retail centre houses 350 separate businesses with a daily footfall of about 150,000. One London business centre has 18 buildings with 53 major businesses and 63,000 staff.
- An emergency in a facility within the scope of this document will inevitably affect large numbers of people. It is therefore essential that planning caters not only for the handling of the incident, but also for its human consequences. For example, evacuation to a muster area is the start of a process, not an end in itself. Planners must consider shelter, information, immediate care and onward movement – plus a host of other human needs if they are to discharge their duty of care properly and protect their business and public reputation. The potential magnitude of this task (and what can be achieved) is shown by the evacuation of Bishopsgate in London, in response to a

terrorist threat. 62,000 people were evacuated safely from their workplaces in 48 minutes. However, it is an assumption within ISM that evacuation creates its own risks and necessitates on-going concern for the welfare of the evacuees.

**32. Developing Capabilities.** Effective response requires the application of capability, which is defined as the capacity to create a specified outcome in defined conditions. Where the outcome is the successful management of an emergency within the facility, capability can be defined in terms of:

- Equipment.
- People.
- Controls.
- Procedures.

**33.** These combine to create capability. The emergency planning process will probably expose capability shortcomings that require action, modification of arrangements or a combination of both. Corrective activity must then be managed as a programme of projects linked to the planning process. Typical issues may include:

- **Equipment.** Communications equipment may need to work in confined spaces and adverse conditions, and when the mobile telephone network is overloaded or disrupted.
- **People.** Staff must be selected for, and trained in, their emergency roles.
- **Control.** Command and control arrangements must be robust, proven and the essential details known to the emergency services.
- **Procedures.** Instructions, procedures and drills must be communicated to all those likely to be effected by them, and not just those who are required to carry them out.

**34. Training.** The ability of an organisation to withstand scrutiny of its emergency planning and response, in the courts, the media or by public inquiry, will be influenced by:

- The extent to which it anticipated events that were reasonably foreseeable, through good risk assessment.



- The quality of its planning for those events.
  - The quality of training given to staff who were required to implement the plan.
  - The extent to which plans and procedures were actually followed.
  - The leadership and performance of all staff who were involved.
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### Key Recommendation 16

Plan for safety by anticipating the logic by which it would be scrutinised externally after the event. In particular, note the value of using accepted good practice models for the overall strategic direction (ISM) and the different elements of the process, such as risk assessment, planning and training. At the next level of scrutiny, ensure that the integration and coherence brought to these activities is documented and visible to audit.

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**35.** Training is, therefore, an extremely important step in the overall, iterative planning process. It needs to be conducted at the individual and the team level and the need for external assistance should be considered. Training involves transferring knowledge, skills and attitudes. It should also include an element of rigorous testing, so that people know what they have to do in an emergency and managers are confident that they have proven their ability to do it – under reasonably realistic conditions.

**36. Exercises.** The main aim of an exercise (or simulation) is to test the validity of the instructions, procedures and drills embodied in a plan. It has a secondary benefit in that gives a certain degree of individual and team training and confidence-building (if it is successful). However, the purpose is to test the plan – not the people. It follows that people have to be trained in their roles before the plan is tested in an exercise.

Otherwise, if an exercise goes less well than was hoped for, it can be difficult to identify whether the plan or the people failed. Thus, it is pointless to put untrained people in exercises as well as potentially unfair. Finally, thought should be given to inviting the emergency services to take part in, contribute scenarios to or - at least - observe the exercise. They, or another external agency, could provide useful objective scrutiny and so make the process of de-briefing and learning lessons more objective and meaningful.

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### Key Recommendation 17

Ensure that staff are suitably trained to implement an emergency plan, before testing it by exercise or simulation.

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### Key Recommendation 18

Exercises should be scrutinised by an external authority, and their feedback and recommendations captured on record. There should be a clear audit trail from the lessons identified process to approval or adaptation of the plan, and so on.

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### Response

**37.** Because of the magnitude and diversity of the risks present in a complex and built environment, the emergency services' response to a major incident will usually be multi-agency. That is to say, it will require the attendance of more than one of the emergency services who will co-ordinate their specialist activities to form a combined response. The choice of lead service will be determined at the scene according to the nature of the incident, except in the case of



terrorist attack when the police will always lead. A general description of the organisation and procedures that the emergency services use in a multi-agency response is given in Emergency Response & Recovery Chapter 4.

**38.** Staff employed within a facility have responsibilities that include:

- Making all reasonable endeavours to protect the lives, health and safety of members of the public who may be present as customers, passengers or visitors. This includes, for example, enabling and assisting their safe evacuation. The test of 'reasonableness' in such cases rests on the observation that employees have no right to a level of risk lower than that facing the people whom their duty requires them to evacuate.
- Taking prompt action to prevent a situation from becoming worse. Again, the criterion of reasonable expectation applies.
- Conforming to site safety arrangements and plans.
- Assisting the emergency services in the conduct of their duties. Under certain circumstances it is an offence to fail to assist a police constable if directly requested to do so, or to fail to evacuate a building or area when so instructed in response to terrorist action.

**39.** In an emergency the senior management team bears ultimate responsibility for the life, health and safety of the public on the site and of employees. Associated duties should include:

- Initiating their emergency control facilities and structures, and directing the immediate response until the emergency services take control.
- Managing the evacuation of the site or part of the site affected.
- Briefing the emergency services' commanders on the situation, and standing by to provide additional information (such as plans and site maps) that may be requested.
- Putting actions in hand to mitigate the effects of the emergency on public and staff in accordance with previously agreed plans.
- Initiating business continuity arrangements.
- Preparing to send an empowered senior manager to the emergency services control centre if requested.
- Establishing the scale of the business recovery task and directing associated planning.

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### Key Recommendation 19

Ensure that the duties and expectations placed on all staff are agreed, understood, recorded and trained for. Also, ensure that all the functions needed for the implementation of a plan are allocated to an individual by name, post or appointment. This must be co-ordinated at facility level, and the currency of lists and contact details maintained. Periodic checks also need to be made to ensure that partners have the correct, properly maintained versions of any plans that are shared.

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## Recovery

**40.** In most circumstances the local authority will co-ordinate the multi-agency post-emergency recovery effort. Their task in relation to business recovery is to create an appropriate and positive policy environment within which this can happen. The physical aspects of recovery operations are primarily the domain of insurance loss adjusters and engineering contractors that finance and complete the necessary work.

**41.** General guidance on recovery planning and management is in Annex 1b of Emergency Response and Recovery. The speed and long-term effectiveness of business recovery rests critically on the quality of leadership applied and the unity of purpose it creates.

## Conclusion

**42.** ISM provides a rigorous, conceptual framework for managing public safety in complex and built environments, as well as a practical toolkit for achieving integration and coherence. It is based on tried and trusted principles that are in common use by the agencies of civil protection, with whom the safety managers of facilities should be in close liaison. It also meets the need for a standard, overall philosophy on public safety management that brings an over-arching logic to the business and links it to the concerns, processes and outcomes of the wider resilience community. If the concept is applied, with rigour and good judgement, the outcome should be integrated safety policies and practices that are coherent between the stakeholders within a facility, and between the facility and external agencies. The result will be a sustainable improvement in standards of public safety and good practice.